

volumes, the available space of which has been still further reduced by the numerous good illustrations the editor gives us. There are, however, cases where the really important information is not given. Take, for instance, the note on *Molinia coerulea*. We are told that it has the power of absorbing considerable quantities of the salts of heavy metals, and a case is quoted where the ash contained 2.041 per cent. of lead oxide, 0.266 per cent. of copper oxide, and 0.265 per cent. of zinc oxide; further, we are told that it is regarded as a bad pasture grass. Now *Molinia* is a weed and not a cultivated crop, and the things the chemist wants to know about it are these: What soil conditions does the presence of *Molinia* indicate? and has *Molinia* ever been observed to produce any ill-effect on animals? if so, what is the harmful constituent? Information could have been given on the first point that would have been valuable, for *Molinia* is a useful "indicator" plant. Again, we are given analyses of animal excreta, but no mention is made of the fact that the composition is very variable, nor are we told whether the figures represent means of many analyses or only one or two determinations.

A more serious defect, however, is the omission of references. The student is rarely told where to go for fuller information, and it is practically impossible for him to check the data given in the article unless he knows his way about the literature of the subject. It is inevitable that dictionary notes should be short and should omit much; their great value ought to be the guidance they afford to the man who wants to learn more. But even with this defect the volumes are very useful, and will prove a distinct acquisition to the agricultural chemist.

E. J. RUSSELL.

RADIO-CHEMISTRY.

Radiochemistry. By A. T. Cameron. Pp. viii+174. (London: J. M. Dent and Sons, Ltd., 1910.) Price 2s. 6d. net.

THIS book purports to be an "exact account of our present knowledge of the chemical properties of the radioactive substances and their chemical effects," and in the preface much stress is laid on the "accuracy" of the facts and theories here presented. It is further stated that the subject is "treated from a chemical standpoint," while "the physical side is introduced only so far as is necessary to explain the special experimental methods." As to how well the author has attained the latter object can be best judged from two examples, one a description (quite incorrectly asserted to be "that in Rutherford's 'Radioactivity,' p. 86") of a Wilson type of electroscope (p. 10), where, in addition to a very extraordinary earth connection, the movement of the aluminium leaf is observed by a "telescope" which "carries a scale," a distinctly inconvenient and unusual arrangement; and the other a description of a Dolszalek electrometer (p. 13) having "one pair of quadrants connected to earth, the other to an insulated metallic plate facing a second which carries the radioactive matter to be tested." "Through action similar to that in the case of an electroscope an electric stress is set up between the two pairs," and "the needle, previously charged

to a very high potential, is repelled from one pair of electrodes towards the other"!

The chapter on the "Classification of the Radio-active Elements—their Physical and Chemical Properties" might be expected to justify the title chosen for the book, but it is disappointing to an extreme extent; the chemical properties of uranium, for example, being dismissed with the bare statement that "it belongs to the iron group of elements and is precipitated by ammonium carbonate." The discussion of the identification of ionium is quite misleading, and the account of the chemical properties of the other radio-elements of a very superficial character. The statement that thorium "occurs chiefly in Ceylon" is certainly surprising. It is doubtful whether anyone not already somewhat familiar with the subject could separate or identify a single radio-element from the directions which are given.

Errors and misleading statements are not uncommon. Thus (p. 17) the simple exponential equation $I_t = I_0 e^{-\lambda t}$ is given in an inverted and incorrect form, which again appears later (p. 90). Further examples are the statements (pp. 56, 141) that radiothorium "is precipitated with barium," "resembles radium in every respect," and has an activity "several hundred thousand times that of radium"; that in the separation of uranium X by treatment with a mixture of ether and water (p. 39) "the ether layer contains most of the photographic or β -ray activity"; that the active deposit from the radium emanation (p. 51) "decays to half value in twenty-eight minutes, but the decay curve is very irregular"; and that "the actinium products have all extremely short lives so that the maximum activity is quickly reached (p. 56). The mention of the "decay curve of a *radioactive child*" (p. 17) certainly suggests the most gruesome possibilities!

B. B. BOLTWOOD.

EGYPTOLOGICAL RESEARCHES.

Egyptological Researches. By W. Max Müller. Vol. ii., Results of a Journey in 1909. Pp. v+188+47 plates. (Washington: Carnegie Institution, 1910.)

FOUR years ago Herr W. M. Müller, now of Philadelphia, published a first volume of "Egyptological Researches," brought out at the expense of the Carnegie Institution of Washington, which had borne the expense of the journey to Egypt in 1904 the results of which were thus published by Herr Müller. In 1906 Herr Müller undertook a second journey to Egypt, and now publishes a second volume of these "Researches."

Herr Müller's chief aim on both journeys was to pick up as much as possible of the hitherto unedited and badly edited historical material which still is to be found in the inscriptions of Thebes, notwithstanding the labours of many Egyptologists. In his first volume he published in colour the extant remains of the famous pictures of Minoan Cretan ambassadors in the tomb of Senmut, the prime minister of Queen Hatshepsut, which are so important to the Greek archæologists. These pictures had already been pub-

lished long ago, in colour, by the French scholar Prisse d'Avennes. The tomb was then lost sight of until re-discovered by Prof. Newberry some years ago. No new publication of the tomb was made, though it is understood that Mr. Howard Carter made a fine coloured drawing for one, until Mr. H. R. Hall published some rough sketches, correcting Prisse's errors, in the "Annual of the British School at Athens" (vol. viii., pp. 172-3), following this up with a photograph of the whole important scene, in the same publication (vol. x., p. 154). Herr Müller then followed with a coloured reproduction on a larger scale in the first volume of "Egyptological Researches." This is very useful, though naturally it is not likely to be so good as Mr. Carter's drawing, which so unaccountably remains unpublished still. Herr Müller's colours were too crude.

In the present volume of "Researches," Herr Müller provides us with similar (and too crudely) coloured reproductions of the scenes painted on the walls of the tomb of Menkheperâ-senb, which also include representations of Minoans. The figures and features of the Cretan ambassadors to the court of Thothmes III. are here represented more clearly than in the tomb of Senmut, though the vases which they carry are not so well or so carefully portrayed. The best of all these representations is probably that in the tomb of Puamra, also at Thebes, which will, we hope, shortly be published with a coloured drawing made on the spot by a most competent artist, Mr. de Garis Davies.

Herr Müller publishes a great many other scenes from tombs and temples at Thebes, with explanations, which are naturally comprehensible only to Egyptological experts, though the subjects of which they treat are of great interest to the general historian, anthropologist, and archæologist. Herr Müller is too technical, is insufficiently explicit, and assumes too much knowledge on the part of his readers, since he is not now writing exclusively for the edification of his *engeren Fachgenossen*. His style also is too note-booky, too much mere jotting down, too *staccato*, though we must congratulate him on his command of English. It is true that he would have done well had he submitted his text for revision to an American colleague before publication, as there remain in it many clumsy phrases and strong Teutonisms. Such forms as "Merenptahtext," "Kahunpapyrus," are German, not English; we always insert a hyphen between the elements of such combinations. We may also quote a very weird phrase on p. 76, "not doest thou look at the mountains" for "thou dost not look at the mountains"; and the quaintly unintelligible sentence, "strange that Duemichen's uncritical credulity toward the plays of the latest time has been revived recently!" (p. 39), needs an Egyptologist with a knowledge of German as interpreter. Herr Müller is not talking about *Schauspiele*, as one might suppose. It is not clear to us what, or rather whom, he is here talking about, or rather, at; this writer seems somewhat given to cryptic "digs" at other men of science, which are apt to fall flat if incomprehensibly phrased!

Though the coloured plates might sometimes be

more carefully printed (e.g. plate xii. in our copy), the photographic illustrations of the battle-scenes of Rameses II. at Karnak and Luxor are very fine, and the whole book reflects credit on its author and great credit on the Carnegie Institution.

UNPROGRESSIVE PETROLOGY.

Les Roches et leurs Éléments minéralogiques; Descriptions, Analyses Microscopiques, Structures, Gisements. By Ed. Jannettaz. Fourth edition, revised and enlarged. Pp. 704. (Paris: A. Hermann et Fils, 1910.) Price 8 francs.

MOST of those who were students of petrology in the later years of the nineteenth century were familiar with a modest volume, published by the late M. Jannettaz, under the title of "Les Roches." It had a special interest for English readers, as it enabled them to realise the lines on which the teaching of the subject was carried on in France. Amongst other matters, it comprised a readable account of the Haiüy system of crystal notation long forgotten in this country, a short section on crystal optics, and a description of the chief rock-forming minerals and rock types.

It was considerably enlarged but hardly improved in the third edition published, after a long interval, in 1900, and still to be found in some of our reference libraries. More than a hundred pages are devoted to the optical characters of crystals, but the treatment is at once ambitious and incomplete, and whatever merits it possesses are obscured by the innumerable misprints and blunders, which are found in its pages, and must render them almost unintelligible to anyone who resorts to them for information. It is difficult, indeed, to believe that the proofs ever passed through the author's hands. We find, for instance, " $E^2/2$ " for E^2/α^2 , " $\cos^2 \pi t/T$ " for $\cos 2 \pi t/T$, and are startled to learn that " $\cos r=2$." The description of the rock-forming minerals is expanded into a treatise on the entire mineral kingdom and little used terms like newjanskite and sysserskite are included, while we look in vain for the refractive indices and birefringence of the commoner rock-forming minerals. The classification and nomenclature of the igneous rocks is open to serious criticism, and is based to a considerable extent on chronological principles, for we are told:—"Les géologues répugneront longtemps à confondre sous le même nom des roches qui sont arrivées au jour à des époques si différentes."

It would have been a work of supererogation to enumerate the defects of a book published ten years ago, if the fourth edition, which bears the date 1910, had not proved on careful examination to be identical with its predecessor. It is not merely that the advances of science in the interval have been ignored, but that every inaccuracy in the third edition, however obvious to the most casual reader, is faithfully reproduced. A hiatus in a reference, represented by a line of points, is left still unfilled, and even the table of errata, which corrected only a fraction of the misprints, and added more of its own, remains word for word the same. Yet we are told that this is a new edition, "revue et augmentée." The revision consists,